

Vending Machine Sanitation

The changing character of the vending machine industry has given rise to new needs for sanitation. These needs, as well as current research and control efforts, were treated in panel discussions at the Regional Educational Conference of the National Association of Sanitarians in Atlantic City on November 11, 1956. The following are highlights from the panel presentations of Arthur J. Nolan, Dr. Walter L. Mallmann, and William C. Miller, Jr.

Sanitary Control Criteria

brief Coin machine sales of products and services, exclusive of music and games, amounted to approximately \$2 billion in 1956. More than 45 classes of products were sold, from aspirin to tissues, and including numerous items of food and drink. Typical service vending machines are coin changers, washing machines, toilet locks, and mechanical ponies.

The kinds and numbers of coin machines, particularly those dispensing food, have increased sharply each year.

To illustrate the scope of the industry, here are some statistics from the January 1956 *Vend*

By Arthur J. Nolan, M. S., vice president, research and development, Dixie Cup Co., Easton, Pa., and chairman of the National Automatic Merchandising Association Sanitation Committee.

Magazine census covering product vending machines on location :

	<i>Units</i>
Confection and package goods.....	1, 500, 000
Cigarettes and cigars.....	600, 000
Bottle drinks.....	650, 000
Cup drinks, cold.....	75, 000
Cup drinks, hot.....	75, 000
Ice cream and frozen confections.....	30, 000
Packaged and bulk milk.....	30, 000
Miscellaneous other products.....	200, 000
Total	3, 160, 000

The rapid expansion of the vending machine industry after World War II brought to the fore a number of questions in the area of sanitation and public health.

There had been no recognition of the food and drink vending machines as such. Health jurisdictions were somewhat at a loss about how to interpret existing ordinances. Too often these had been set up for restaurants or food establishments, and chain stores, and the

special problems connected with unattended automatic vending machines were not contemplated.

At the National Sanitation Foundation meeting in 1947, a vending machine clinic initiated a program for research and standards in sanitation. The clinic was attended by manufacturers, suppliers, sanitarians, and by representatives of other public health groups. The program has continued from 1948 to the present. Research problems are referred to Dr. Walter L. Mallmann at Michigan State College.

The Public Health Service is drafting a model code and ordinance for food and drink vending machines. Concurrently, the National Automatic Merchandising Association committee is completing negotiations at several universities with public health schools and adequate laboratory facilities to test and inspect various types of vending machines against the standards proposed in the model code and ordinance. Additional standards, as needed, will be developed by a joint committee of industry and public health.

This committee of industry, military, and public health representatives, including Public Health Service officials, is being formed to evaluate the testing and continuing research programs. Representatives have been appointed by industry and by such organizations as the International Association of Milk and Food Sanitarians, the National Association of Sanitarians, and the American Public Health Association. They will meet shortly to examine the proposed program and protocol.

Microbiological Research

brief What differences in health and spoilage aspects are presented by coin-vended food and beverages that are not exhibited in manually dispensed products? Offhand, I think of two. Vended products are unique in that there are no

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personnel to supervise delivery of the product to the consumer. And then, the location of the coin machine may be in surroundings that definitely are objectionable for open-food dispensing.

The objective of research on vended food and beverages is to determine the minimum conditions under which they can be dispensed without adversely affecting health. Despite extensive research in food sanitation, the plan of robot vending introduces numerous problems of machine design and operation. The mechanical device has no power to differentiate between satisfactory and unsatisfactory products. The machine must be designed to prevent contamination by the environment or by the user and to maintain the food properly between servicings.

Although some research has been done on the various types of machines and products, much more information is needed on protection against health hazards, effect of contact surfaces on the product and the consumer, storage life of the product, temperature of storage, and kinds of spoilage encountered in vended products. So far, tests have been made on dispensers of carbonated beverages, fruit juice, milk, dry and liquid coffee, dry and liquid soup, sandwiches and salads stored at 50° F. or less and canned and commissary-prepared foods stored at 150° F.

My own work on carbonated beverages indicates that the sirups are relatively resistant to microbial decomposition because pH is low, sugar content is high, and sodium benzoate has been added. Storage of sirups under carbon dioxide atmospheres or at temperatures of 50° F. or less prevents mold. To lessen the introduction of microbial contaminants, all storage tanks, sirup lines, mixing valves, and other contact surfaces should be readily removable, easily disassembled, and easily cleaned. Obviously, the machine should be designed for protection against insects, rodents, and dust.

This holds for the general sanitary design of all coin-operated machines handling food products regardless of the degree of perishability.

Frequent cleaning and sanitizing is recommended for machines dispensing fruit juices, liquid soup concentrates, chocolate sirup, and other readily perishable products. The addi-

tion of fresh products to residuals is not condoned because bacteria in the residuals may contaminate the fresh product, with possibly hazardous consequences.

Where readily perishable products, such as milk and cream, are dispensed, delivery tubes, valves, containers, and any other surfaces in contact with the ingredients or the finished product should be cleaned and sanitized at a central commissary. Research finds that microorganisms grow rapidly in such equipment unless it is cleaned and sanitized each time it is serviced.

The storage of soups and stews at a temperature of 150° F., or above, is a novel method of dispensing food. We have little information on long-time storage of foods at high temperature even in the area of "commercially sterile" canned products. Tests on canned products indicate little, if any, deterioration in quality after a reasonable period of storage.

Each new development in automatic dispensing of food brings new needs for research. Research to date indicates that the developments in coin-vended food are largely sound and that the food vended is sanitary.

Ordinance and Code

brief Initially, food products sold in coin-operated vending machines were nonperishable or semiperishable, but the range of such foods has broadened in recent years to include many foods and beverages of a readily perishable nature. This transition introduced new problems of food protection not normally encountered in conventional food service operations.

As the vending of perishable food expanded, many States and communities requested the Public Health Service to develop criteria for sanitary control of machine-vended foods. The National Automatic Merchandising Association also asked the Service to develop a

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Poisoning From Vending Machine Drinks

The Los Angeles Health Department reported that two persons experienced nausea and vomiting within 15 minutes after drinking from a bulk vending machine. Investigators found that a defective carbonator valve permitted carbon dioxide to back up into a copper waterline. Chemical analysis of water from the carbonator indicated 260 p.p.m. of copper.

model sanitation ordinance and code for vending machines as a guide for interested State and local health jurisdictions and for industry. They felt that uniform sanitation standards, similar to those developed by the Public Health Service for the sanitation of restaurants and market milk, were essential.

In 1954 the Service initiated field studies of current vending machine design, fabrication, and operation. Problems encountered were discussed in detail with State and local food sanitation authorities and representatives of the vending industry. Conferences were also held with groups and individuals connected with research in vending machine operations.

One of the first steps was a review of State and local regulations specifically directed to the sanitary control of vending machine operations. In 1954 only six local health departments reported adoption of such regulations, but many recognized the need for sanitary control of food vending. The most comprehensive standards reviewed at that time were those developed for the Armed Forces by the Subcommittee on Food Supply, Committee on Sanitary Engineering and Environment, National Research Council. Although designed for bulk-type machines vending carbonated beverages into single-service containers, the general criteria proposed in these suggested standards appeared applicable to many other vending machine operations. Industry also felt that these criteria could be applied practically.

Upon the conclusion of background preparation, the actual drafting of a proposed ordinance and code began in 1955. After a working draft was completed and discussed with industry, the second working draft was submitted in April

1956 for review and comment by all States, a representative number of communities, Federal agencies, the vending machine industry, and interested groups and individuals. Comments received are now under careful study for incorporation into the prepublication draft.

The format of the working draft resembles that in other recommended milk and food ordinances and codes developed by the Public Health Service: The ordinance provisions are followed by code material which details conditions of satisfactory compliance.

Sanitation provisions for vending machine operations are in section V of the proposed ordinance. This section is divided into seven parts. Part I deals with the source, wholesomeness, and protection of the food, beverage, and ingredients; refrigeration and warm storage of food; cleaning and bactericidal treatment of food contact surfaces; and protection of single-service containers. Part II relates to machine

location, and part III, exterior construction and machine maintenance. Part IV establishes construction and design criteria for both food contact and nonfood contact surfaces. Parts V and VI deal with water supply and waste disposal, and part VII contains provisions concerning the delivery of foods, ingredients, equipment, and supplies to the machine location.

The other sections relate to administrative procedures, disease control, and enforcement considerations.

Since the vending of readily perishable foods and beverages are the major public health problem, most of the ordinance provisions are concerned with the protection of these products. However, the ordinance itself covers all types of food and beverage vending machines.

Following a review of the prepublication draft of the ordinance with representatives of both official agencies and industry, the document will be published.

Emergency Health Service Training

Training in numerous phases of emergency health services is available to professional medical and health personnel on a nationwide scale.

The training covers public health activities in national emergencies, epidemiology, advanced training for sanitary engineers, public health nursing, operation of emergency water supply equipment, radiological monitoring, detection and control of radioactive pollutants in water, organization of communicable disease control programs, and active duty under actual emergency conditions.

Confined principally to officers in the Public Health Service's Commissioned Reserve, the training is made available either by attendance on active duty or through correspondence courses. Commissioned Reserve officers are professional medical and health workers who serve on active duty primarily in times of

national emergency and during training periods.

Courses are held regularly in Public Health Service facilities in Atlanta, Cincinnati, San Francisco, and Washington, D. C. Other courses are given by the Federal Civil Defense Administration in Battle Creek, Mich., by the Industrial College of the Armed Forces in Washington, D. C., or in association with local health agencies.

The Commissioned Reserve is open to physicians, nurses, dentists, sanitary engineers, pharmacists, veterinarians, psychologists, bacteriologists, microbiologists, medical record librarians, statisticians, health educators, medical and psychiatric social service workers, and other professional personnel actively engaged in preventive medicine and public health practice.